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7.1 INTERRELATED/INTERDEPENDENT ACTIVITIES

This section identifies the interrelated or interdependent activities associated with the proposed project described in Section 4.0. In a Section 7 consultation, the interrelated and interdependent activities are considered in concert with proposed project to determine project-related effects. The effects analysis for the interrelated and interdependent activities consider direct effects on listed species and critical habitat. The effects analysis should include an assessment of factors that would reduce the likelihood of the survival of listed salmonids or prevent their recovery (NMFS 1999b).

The ESA Section 7 handbook defines an *interrelated activity* as an activity that is part of the proposed action and depends on the proposed action for its justification. In other words the activity would not occur if it were not for the existence of the proposed action under consultation. An *interdependent activity* is defined as an activity that has no independent utility (or function) apart from the action under consultation.

An effective way to determine whether other activities are interrelated to, or interdependent with, the proposed project is to apply the “but for” test (USFWS and NMFS 1998). To test if an activity is *interrelated*/*interdependent*, the relevant inquiry is whether another activity would occur <u>but</u> <u>for</u> the proposed project under consultation. If it would not occur, <u>but</u> <u>for</u> the proposed project, then the activity is interrelated or interdependent and its effect on listed species must be assessed as part of the overall project. If the activity in question would occur “regardless” of the proposed project under consultation, then the activity is not interdependent or interrelated.

Interrelated and interdependent activities are always measured against the project. For example, the USACE could request a consultation on the construction of a dam, which would provide water to private irrigation canals once the dam is built. Since the private irrigation canals would not exist “but for” the presence of the constructed dam, they are interrelated to the proposed project. In this example, the effects of the activity external to the project (the canals) are analyzed with the effects of the action under consultation (the dam) because it is interrelated to the proposed action.

The following activities are interrelated to, or interdependent with, the proposed project:

- Water transmission to the water contractors and the wastewater discharge, recycling, water conservation measures, and runoff into streams of transmitted water.
- Non-native predators stocked in reservoirs for recreational fishing.
- Recreational fishing for steelhead.

- Channel maintenance on Public Law (PL) 84-99 (nonfederal) sites in Russian River and Dry Creek.

- City of Ukiah's Hydroelectric Facility.

Section 7 of the Endangered Species Act requires that the effects of the project under consultation must be analyzed together with the effects of any interrelated/interdependent activities, to determine the overall impact of the project on listed salmonids. In sections 7.2 through 7.6, the effects of each interrelated/interdependent activity are individually discussed. In Section 7.7, the total effects of the proposed project and the interdependent/interrelated activities on salmon species in the Russian River are analyzed. In Section 7.8 the cumulative effects of future activities in the Russian River Basin are described. Finally, Section 7.9 provides a brief summary of all of these activities and their effects on listed salmonids.

7.2 WATER TRANSMISSION TO THE SERVICE AREAS OF THE WATER CONTRACTORS

SCWA is a water wholesaler that provides water to water contractors that serve approximately 600,000 people in Sonoma and Marin counties (SCWA 2000c). SCWA operates a water transmission system that delivers water to public and investor-owned water distribution systems operated by municipal water customers. The water transmission system is financed by payments under the Eleventh Amendment Agreement (see Section 3.3.1). The parties to the agreement are SCWA, the cities of Santa Rosa, Petaluma, Rohnert Park, Sonoma, and Cotati, the North Marin Water District (NMWD), Valley of the Moon Water District, and Forestville Water District. In this document, these parties are referred to as the primary water contractors. SCWA also supplies water to the Marin Municipal Water District through separate contracts (S. Shupe, Sonoma County, pers. comm. 2003). There are also several smaller water users (referred to as secondary contractors) who obtained water directly from SCWA's transmission system and/or divert water from the Russian River under SCWA's diversion rights.

7.2.1 WATER DISTRIBUTION

The principal sources of water for the SCWA water transmission system are Dry Creek and the Russian River. The flows in these streams are regulated with releases from Lake Mendocino and Lake Sonoma via the Coyote Valley and Warm Springs dams (see Sections 3.1 and 3.2). A secondary source of water for SCWA is its three production wells located west of the City of Santa Rosa, near the Laguna de Santa Rosa (SCWA 2000c).

7.2.1.1 Primary Water Contractors

Figure 7-1 is a general map showing the location of SCWA's water transmission system and the primary water contractors' service area. The service areas extend from Marin

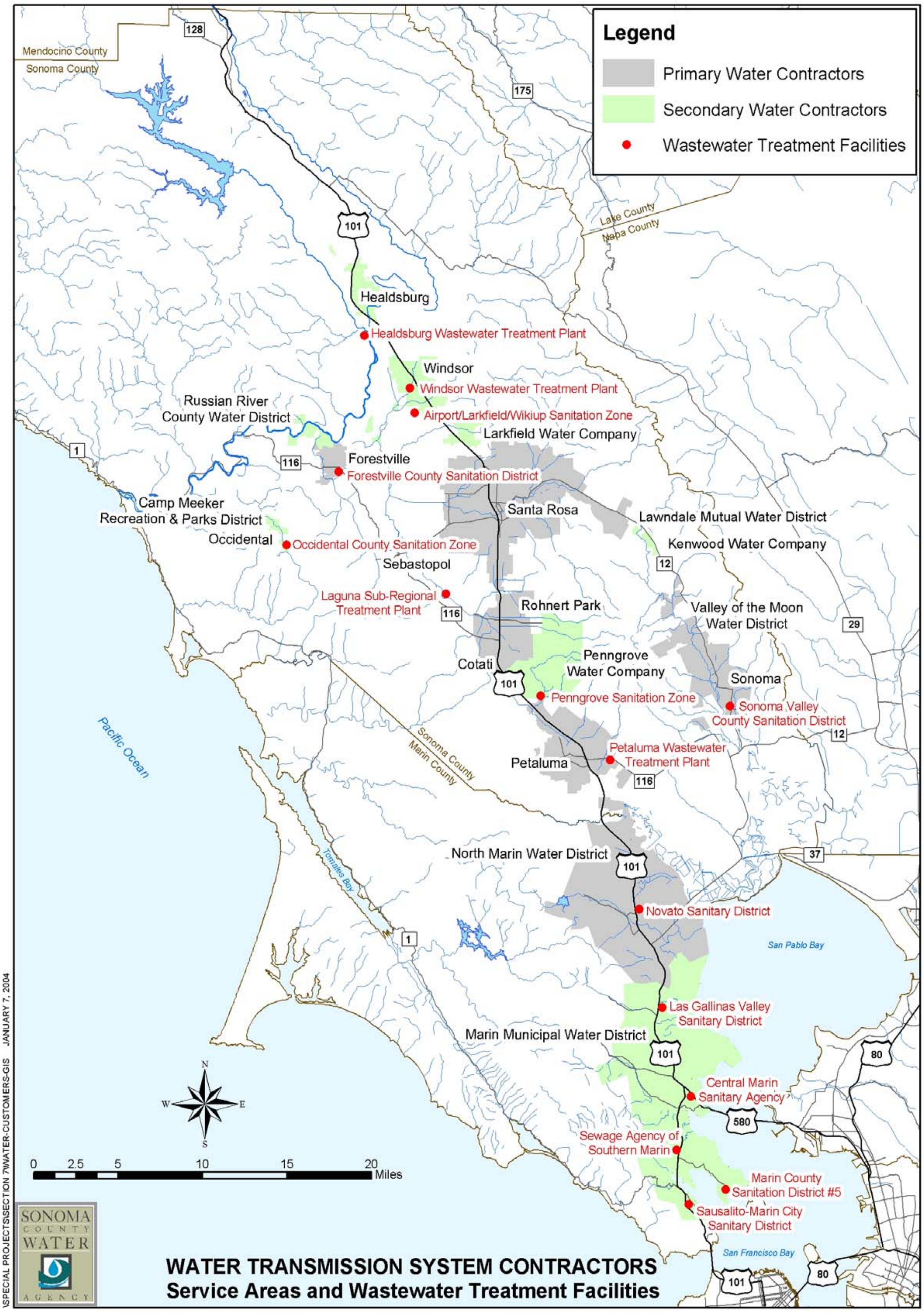

Figure 7-1 Service Areas of SCWA's Water Contractors

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County northward to Santa Rosa, and to the City of Sonoma on the east and to Forestville on the west. Table 7-1 shows the water distribution infrastructure for the eight water contractors. For most contractors, SCWA provides the primary water supply, while a few contractors, such as Rohnert Park, get a significant amount of water from local wells.

The eight primary water contractors receive about 85 percent of the total amount of potable water delivered by SCWA annually (Table 4-1 in SCWA 2000c). A brief description of the water distribution facilities of these primary contractors is given below:

- The City of Santa Rosa depends almost entirely upon SCWA for its water supply. Santa Rosa's water distribution system includes 554 miles of pipelines, 18 enclosed reservoirs that store 18.2 million gallons (MG), and 16 pump stations to supply the city's 160,000 customers. The city also operates seven wells, which provide a backup water supply of 6.5 MG of water per day (mgd) (SCWA 2000c).

  Santa Rosa's rate of delivery during the peak demand month is limited to 56.6 mgd and annual deliveries are limited to 29,100 acre feet (AF). The city's current average-day peak-month demand for water usage is 34.9 mgd (SCWA 2000c).

- The City of Rohnert Park depends upon groundwater and water supplied by SCWA to meet the demands of its 40,000 residents. Rohnert Park's maximum average monthly delivery rate is limited to 15.0 mgd, and an annual limit of 7,500 AF.

  The principle source of water for Rohnert Park is a series of 39 groundwater wells, which account for approximately 61 percent of the city's water supply (with the remaining 39 percent received from SCWA). These wells have a reliable capacity of 4,481 AFY. In addition, the city has seven storage reservoirs with 4.2 MG of storage capacity (SCWA 2000c).

- The City of Sonoma's maximum average monthly delivery rate is limited to 6.3 mgd, with an annual limit of 3,000 AF. The city currently has 3 operational groundwater wells with a production capacity of 1.1 mgd and a long-term reliable capacity of approximately 448 acre feet per year (AFY) (SCWA 2000c).

- The City of Cotati obtains approximately 70 percent of its water from SCWA. The city obtains the rest of its water from 3 operational groundwater wells with a production capacity of 1.1 mgd. The long-term reliable capacity of these wells is approximately 896 AFY.

  Cotati's maximum average monthly delivery rate is limited to 3.8 mgd, with an annual limit of 1,520 AF (SCWA 2000c).

- The Community of Forestville receives all of its water from SCWA. Under the current contract, Forestville is limited to a maximum average monthly delivery rate of 1.5 mgd. In 2000, Forestville received approximately 480 AF of water from SCWA. There is no annual limit on water supplied by SCWA to the Community (SCWA 2000c).

Table 7-1 Primary Water Contractors

Water Contractor	Customer Connections	Pumping Stations	Storage Tanks	Storage Capacity (MG)	Wells	Local Production Capacity (AFY)	Maximum Average Monthly Delivery Rate (mgd)	Annual Delivery Limit (AF)	Nonagricultural Water Use[1]
Santa Rosa	46,060	16	18	18.2	7 standby use	4,817	56.6	29,100	RES: 71% IIC: 12% LS: 17%
Rohnert Park	8,496	0	7	4.2	39	4,481	15.0	7,500	NA[2]
Sonoma	3,550	-	5	3.2	3	448	6.3	3,000	RES: 75% IIC: 19% LS: 6 %
Cotati	7,760	-	2	1.1	3	896	3.8	1,520	NA
Forestville	913	-	4	1.7		0.0	1.5	No annual limit	RES: 73% IIC: 23% LS: 4 %
Petaluma	17,940	7	11		11	3,585	21.8	13,400	RES[3]: 69% IIC: 31% LS: NA
NMWD	21,300	-	26	27.5	0	2,000	19.9	14.100	RES: 80% IIC: 18% LS: 2%
Valley of the Moon	6,648	-	9	4.5	5	1,008	8.5	3,200	RES[3]: 85% IIC: 15% LS: NA

[1] Nonagricultural Water Use: RES (residential), IIC (industrial/institutional/commercial), LS (landscaping).
[2] NA: Not Available.
[3] Percentages calculated using only RES and IIC water use values.
Source: SCWA 2000c

- The City of Petaluma obtains its water supply from 11 operational groundwater wells and SCWA. The groundwater wells have a production capacity of 5.4 mgd.

  Petaluma's maximum average monthly delivery rate is limited to 21.8 mgd, with an annual limit of 13,400 AF. The city's 11 operational groundwater wells have a long-term reliable capacity of 3,585 AFY (SCWA 2000c).

- NMWD supplies water to customers in the City of Novato, as well as in several unincorporated towns in northern Marin County (e.g., Point Reyes Station, Bear Valley, Inverness Park, and Olema). In 2000, NMWD supplied 10,736 AF of water to 21,300 households in its service area (SCWA 2000c).

  NMWD is limited to a maximum average monthly delivery rate of 19.9 mgd from SCWA, with an annual limit of 14,100 AF. Due to its distance from SCWA storage facilities, NMWD maintains 26 storage tanks in service, capable of storing a total of 27.5 MG of water. NMWD also has a local surface water source from Lake Stafford, which has a safe yield of approximately 2,000 AFY (SCWA 2000c).

- The Valley of the Moon Water District (VOMWD) serves about 6,000 households in the Sonoma Valley. It receives 85 percent of its water supply from SCWA, with the remainder from local wells.

  VOMWD's maximum average monthly delivery rate is limited to 8.5 mgd, with an annual limit of 3,200 AF. VOMWD currently has 5 operational groundwater wells with a total long-term reliable capacity of approximately 1,008 AFY (SCWA 2000c).

7.2.1.2 Secondary Water Contractors

SCWA also supplies water to other water districts, municipalities, and private water companies to supplement local water needs. The largest of these secondary water contractors is the Marin Municipal Water District (MMWD), which accounts for 88 percent of SCWA's water that is not delivered to the primary contractors. Other smaller contractors include the Town of Windsor, California-American Water Company (Larkfield District), the Penngrove Water Company, the Lawndale Mutual Water Company, and the Kenwood Water Company. Finally, the Russian River County Water District, diverts water from the Russian River under SCWA's water rights, while the Camp Meeker Recreation and Parks District, the City of Healdsburg, and the Occidental Community Service District are waiting for RWQCB approval to divert water under SCWA's water rights. A brief description of these facilities is given below:

- MMWD supplies water to approximately 185,000 people in a 147-square-mile area of Marin County, California, located just across the Golden Gate Bridge from San Francisco. The MMWD gets approximately 75 percent of its water supply from five reservoirs located on Mt. Tamalpais (built between 1905 and 1948) and two reservoirs in west Marin County. The remaining 25 percent of MMWD's water supply is delivered via the SCWA transmission system in Sonoma County and pipelines operated by NMWD and MMWD in Marin County (Marin Municipal Water District 2003).

SCWA supplies MMWD with approximately 8,000 AFY, however, the amount of water can go higher depending on demand (S. Shupe, Sonoma County, pers. comm. 2003). The maximum rate of water delivery from the SCWA Transmission System to MMWD during May through October is 12.8 mgd (Nelson 2001).

- The Town of Windsor obtains its water supply primarily from three large wells located in the deep gravel strata adjacent to the Russian River and one standby well located in the center of town (Santa Rosa 2003). Windsor has a direct connection to the SCWA aqueduct, which can be used during peak periods to augment water supplies. The town received approximately 370 AF of water from SCWA in 2000-2001 (Nelson 2001). Between 1999 and 2003, Windsor also diverted an average of 3,589 AF of water annually from the Russian River under SCWA's water rights (C. Murray, SCWA, pers. comm. 2003).

- The Larkfield District of the California American Water Company supplies water to residents in the unincorporated communities of Wikiup and Larkfield. The water company receives approximately 450 AF of water per year from the SCWA Transmission System (Nelson 2001).

- The Penngrove Water Company supplies water to residents in the unincorporated community of Penngrove. The water company receives approximately 190 AF of water per year from the SCWA Transmission System (Nelson 2001).

- The Lawndale Mutual Water Company receives approximately 60 AF of water per year from the SCWA Transmission System (Nelson 2001).

- The Kenwood Village Water Company supplies water to 500 year-round residents in an unincorporated area of Kenwood Village. The Company receives approximately 3.7 AF of its annual water supply from SCWA (Nelson 2001).

- The Russian River County Water District (RRCWD) supplies water to over 1,180 residents. The RRCWD diverted 47 AF of water from the Russian River under SCWA's water rights in 1999, but has not diverted any water under SCWA's water rights in the past 3 years (C. Murray, SCWA, pers. comm. 2003).

- Camp Meeker Recreation and Parks District (CMRPD) supplies water to 350 year-round residents. The CMRPD has an agreement with SCWA to divert 90 AF under SCWA's water rights (C. Murray, SCWA, pers. comm. 2003). The City of Healdsburg has an agreement with SCWA to divert 4,400 AF under SCWA's water rights (C. Murray, SCWA, pers. comm. 2003). The Occidental Community Services District has an agreement with SCWA to divert 65 AF under SCWA's water rights (C. Murray, SCWA, pers. comm. 2003).

7.2.1.3 Operational Best Management Practices

The water contractors deliver water to their customers through their own pipeline systems that connect to the SCWA transmission system. They also use groundwater from wells to supplement the water they receive from SCWA, and storage tanks to provide water storage for emergencies and to help meet peak demand during maximum demand periods.

Substances used to treat water include chlorine, an orthopolyphosphate compound, and caustic soda (sodium hydroxide). Each substance is contained in accordance with strict regulations, and would not be released under normal conditions. Any significant risk to listed species would be due to accidental spills. The risk of an accidental spills and subsequent exposure of fish to treat water are minimized by up-to-date Spill Prevention, Containment, and Control (SPCC) plans.

The water contractors generally follow the same operational BMPs that SCWA employs, to ensure that potable water does not contaminate local tributaries. Below is a general description of these practices. Note that there may be variations in operations among the different water contractors, due to differences in size and complexity of their systems.

- Groundwater Wells: Operation of wells frequently requires discharging well water to surface drainages for sampling or flushing purposes. These discharges usually involve unchlorinated water, although minor discharges of chlorinated water may be necessary for sampling purposes. This sampling is done to determine if water quality is in compliance with potable water regulations.

  Well maintenance operations generally involve small quantities of potable unchlorinated water; thus, any runoff into the Russian River should not affect water quality.

- Water Storage Tanks: Maintenance of the water storage tanks requires that the tanks be emptied every few years to allow for re-coating of interior surfaces to prevent leaching of metals. These discharges occur under controlled conditions after obtaining permission from the California Department of Health Services (CDHS) and the NCRWQCB (ENTRIX, Inc. 2001d).

  A portion of the water is released to constructed drainage ditches (typically riprapped) to dissipate the energy of discharge flows in order to reduce the potential for erosion. Maintenance staff will add a dechlorinating chemical to any discharge to eliminate any chlorine residue in the discharge. Discharges into constructed ditches are allowed to flow into Russian River tributaries (e.g., Laguna de Santa Rosa, and Atascadero Creek).

  In general, normal operation and maintenance activities are performed with trained personnel and are guided by permitting regulations. Because chlorine would be in the form of a gas, if spilled, the likelihood of it entering the water in severe concentrations is limited. A catastrophic spill in the water from storage tanks could have severe on salmonids within the area of the spill. The SPCC plans (see Section 5.2.5), however, dramatically reduce the chance of spill. Thus, normal operations do not appear to present a significant risk to listed salmonids in the area of the storage tanks.

- Transmission Pipelines: Valves are installed on pipelines to relieve pressure surges, and to prevent breakage. Pressure surges generally occur when power outages trigger a sudden shutdown in water pumps, main vales are open or closed too quickly, or there are sudden pressure losses in gravity feed systems. Pressure surges are generally infrequent, but can result in the discharge of treated potable water.

  Many water contractors routinely flush mains to help prevent stagnated water and eliminate sedimentation that has accumulated in the water mains. A total flush of the system is usually performed at least once a year and discharged water is typically monitored for chlorine residual and clarity.

  Pressure surges, flushing, and accidental spills from the transmission pipelines of the water contractors have the potential to introduce chlorinated water into streams in the Russian River watershed. Most contractors have added dechlorination baskets and to valves to reduce the effects of spillage should they fail. Chlorine can also be removed from potable water during main flushing using diffusers that hold thiosufate tablets.

7.2.1.4 Effects of Water Distribution on Listed Salmonids

Water distribution systems effects are usually related to the use and storage of chemical compounds and other hazardous materials in the water systems. Any risk to listed salmonids would be due to accidental point discharge of treated water containing trace concentrations of these chemicals. Substances used to treat potable water include chlorine, an orthopolyphosphate compound, and caustic soda (sodium hydroxide).

The risk of accidental spills and subsequent exposure of fish to treated water are minimized by the water contractors' SPCC plans and other precautions listed above. Should a spill of potable water containing chlorine or other chemicals occur, the effects on salmonids are likely to be limited to a small area. There are several factors that influence the magnitude of the effects associated with a spill event. The primary factors include the residual chlorine or caustic soda concentration in the discharged water, the capacity of the receiving water to consume or dissipate the residual chemical concentration via physical or biological reactions, and the duration of the spill event. In instances where the chemical concentration is actually high enough to adversely effect salmonids, the effect on individual fish will depend on their ability to detect and move away from the point of discharge.

The operational BMPs implemented by the water contractors to minimize losses of valuable treated water and minimize the cost associated with water treatment help protect water quality in the service area. These practices and the limited number of potential discharge points in the distribution system immediately adjacent to sensitive salmonid habitat, limits the potential for trace amounts of chlorine (added as a disinfectant) and caustic soda (added for corrosion control) to be discharged into spawning and rearing habitat. These institutional controls, along with the physical processes noted above, reduce the risks to salmonids in the Russian River associated with the *interrelated activity* of distributing SCWA water to the water contractors.

7.2.2 WASTEWATER AND RECYCLED WATER

After water purchased by the water contractors is used by their customers, it is collected in underground sewage systems and pumped to one of several wastewater treatment plants (WWTPs) in SCWA's service area, where it receives either secondary or tertiary treatment. Many of these plants also treat water from non-SCWA sources (S. Shupe, Sonoma County, pers. comm. 2003).

The disposal method of treated effluent from the WWTPs varies by season. In general, wastewater may only be discharged into streams between mid-fall and mid-spring of each year. During the remainder of the year, treated wastewater is recycled for irrigation. Water purchased from SCWA that is not recycled is usually discharged back into the Russian River or into the San Francisco Bay only during the discharge season. Wastewater not used for irrigation or habitat enhancement during other times of the year is stored in storage tanks.

The North Coast Regional Water Quality Control Board (NCRWQCB) and the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) regulate treatment plant discharges in SCWA's service area (depending on location) and impose waste discharge requirements.

The Water Quality Control Plan for the North Coast has established policies and an implementation schedule for controlling wastewater discharges to the Russian River (NCRWQCB 1993b). These policies cover discharges of domestic and industrial sewage, nonhazardous wastes from dewatering activities, contaminated groundwater, nonhazardous manufacturing process wastes, and stormwater runoff. In terms of wastewater regulations, discharges from treatment plants into streams are not allowed to exceed 1 percent of the receiving flow. The City of Santa Rosa's sewage treatment plant has an exception, specified in Resolution No. 89-111, that allows discharge rates as high as 5 percent of the flow rate of the Russian River during the discharge period when approved by the NCRWQCB's Regional Board's Executive Officer (NCRWQCB 2002b).

Wastewater discharged to the San Francisco Bay region is governed by policies of the SFBRWQCB. These policies stipulate that treatment plants are prohibited from discharging wastewater into any waterway without first being diluted by a factor of 10:1. They also prohibit the release of treated discharge into dead-end sloughs and similar confined waters, and require that all effluent must be monitored for toxins and solid waste material (SFBRWQCB 2001).

7.2.2.1 Wastewater Treatment Plants

Eleven wastewater treatment plants (WWTPs) serve SCWA's primary and secondary water contractors, including contractors who divert water under SCWA's water rights. Three of the plants are operated and maintained under contract by SCWA and are located in Forestville, Larkfield-Wikiup, and Southern Sonoma Valley. SCWA is also under contract to operate and maintain a WWTP owned by the Occidental County Sanitation District in West Sonoma County. The remaining plants are located in Santa Rosa, Petaluma, Novato, Windsor, and Healdsburg.

These facilities are operated using standard BMPs and are covered by SPCC plans and emergency operations plans that outline safe operating protocols. The emergency plans provide procedures to avoid and respond to accidental spills and releases of hazardous substances (SCWA 1998c).

The locations of the WWTPs are shown in Table 7-2, along with the treatment capacities of the plants, the disposal methods of treated effluent, and the streams where treated water is discharged during the winter months (SCWA 2000c).

Below is a brief description of each treatment facility:

- The Sonoma Valley County Sanitation District (SVCSD) is located on East 8th Street near the City of Sonoma and has a wastewater collection system serving an area over 4,500 acres. The facility services approximately 16,000 single-family dwellings. Wastewater from these dwellings is collected in sanitary sewer pipelines and transported to the Sonoma Valley County Sanitation District plant, which is being to refitted with a membrane system to treat wastewater to a tertiary standard by 2004 (J. Jaspers, SCWA, pers. comm. 2003).

  The treatment plant has an average dry weather flow design capacity of 3.0 mgd and can treat up to 8.0 mgd during the wet weather flow period. During 2000 and 2001, the plant had average dry weather flow (ADWF) of 2.8 and 2.5 mgd, respectively (SCWA 2000c).

  Between November 1 and April 30, treated wastewater is discharged into Schell Slough, a tributary to San Pablo Bay. Schell Slough is a tidal estuary, which receives freshwater from Schell Creek during the wet weather months (mid-fall to mid-spring). During the rest of the year, Schell Slough is a dead-end slough and is flushed only by limited tidal action (SFBRWQCB 2002).

  Discharge of wastewater by SVCSD to Schell Slough can not exceed an initial dilution of 1 part treated water to 10 parts estuarine water to ensure that water quality objectives for the estuary are meet. In general, the effluent limitations specified under the NDPES permit for discharges to San Pablo Bay tributaries are based on the minimal tolerances of aquatic organisms to increases in metal concentrations and changes in salinity (SFBRWQCB 2002).

Table 7-2 Wastewater Treatment Plants Serving the Water Contractors

Area	Wastewater Agency	No. Plants	[1]ADWF Capacity (mgd)	Treatment Level	Method of Disposal	Discharge Channel
Sonoma, Valley of the Moon	Sonoma Valley County Sanitation District	1	3.0	Tertiary[2]	Ag. Land (summer) Slough (winter)	Schell Slough, a Tributary to San Pablo Bay
Forestville, Mirabel Heights	Forestville County Sanitation District	1	0.1	Tertiary[2]	Ag. Land (summer) Creek (winter)	Jones Creek, a Tributary to the Russian River
Occidental	Occidental County Sanitation District	1	0.05	Secondary	Ag. Land (summer) River (winter)	Dutch Bill Creek, a Tributary to the Russian River
Santa Rosa, Rohnert Park, Cotati, Sebastopol	Santa Rosa Subregional Wastewater Reclamation System	2	19.2	Tertiary	Ag. Land Geysers Project (summer) River (winter)	Laguna de Santa Rosa
Petaluma, Penngrove	City of Petaluma WWTP	1	5.2	Secondary	Ag. Land (summer) Creek (winter)	Petaluma River (S.F. Bay region)
NMWD	Novato Sanitary District	2	4.5 2.0	Secondary Tertiary	Ag. Land (summer) Bay (winter)	San Francisco Bay
Town of Windsor	Town of Windsor WWTP	1	2.8	Tertiary	Ag. Land (summer) Creek (winter)	Mark West Creek
Wikiup and Larkfield	Airport-Larkfield-Wikiup Sanitation Zone	1	0.9	Tertiary	Ag. Land (summer) Storage (winter)	No Stream Discharge
City of Healdsburg	Healdsburg WWTP	1	NA	Secondary	Percolation Ponds	No Stream Discharge

[1] ADWF = average dry weather flow, NA = not available
[2] In the process of constructing tertiary treatment facilities
Sources: SCWA 2000c; P. Jeane, SCWA, pers. comm, December 12, 2003.

- The Forestville County Sanitation District will provide tertiary wastewater treatment for the unincorporated communities of Forestville and Mirabel Heights by 2004. The design capacity of the treatment plant is 0.1 mgd and the average dry weather flow to the treatment plant is approximately 0.063 mgd.

  From November to May of each year, treated wastewater from the Forestville plant is discharged into Jones Creek, a tributary of Green Valley Creek, at a rate of up to 1 percent of the receiving flow. During other times of the year, effluent from the plant is used to irrigate agricultural lands. Approximately 11 AFY is reused to irrigate between 25 to 30 acres of land (SCWA 2000c).

- The Occidental County Sanitation District (OCSD) owns a municipal wastewater treatment facility, located east of the community of Occidental, which is operated and maintained under a contract with SCWA. The WWTP treats water to a secondary standard and has a maximum design capacity of 0.05 mgd.

  Between October 1 and May 14, treated wastewater from OCSD is discharged into Dutch Bill Creek, a tributary of to the Russian River, at a rate of up to 1 percent of the receiving flow (SCWA 2003b). The Santa Rosa Subregional Wastewater Reclamation System (SRSWRS) is comprised of the Laguna and Oakmont wastewater treatment plants. These facilities provide tertiary wastewater treatment for the cities of Santa Rosa, Rohnert Park, Sebastopol, Cotati, and the South Park County Sanitation District.

  The Laguna WWTP has an ADWF treatment capacity of 19.2 mgd and an average dry weather inflow of approximately 17.5 mgd. The plant has the capacity to store up 5,100 AF of recycled water, providing up to three months of storage at current flows. The Oakmont WWTP has a treatment capacity of 0.7 mgd and an average dry weather flow of 0.5 mgd. It is operated during the irrigation season and is shut down during the winter (when wastewater is sent to the Laguna WWTP only).

  Recycled water that is not stored or directly conveyed for irrigation is discharged to the Laguna de Santa Rosa between October 1 and May 14, in compliance with the permit from the NCRWQCB. The treatment plant has an exception, specified in Resolution No. 89-111, that allows discharge rates as high as 5 percent of the flow rate of the Russian River during the discharge period when approved by the NCRWQCB. Treated water may be discharged to the Laguna de Santa Rosa or Santa Rosa Creek from several points, primarily at Meadowland pond and Delta pond. The volume and frequency of discharge at any given location varies due to operational and seasonal considerations, including irrigation needs, storage levels, and weather (SCWA 2000c).

  The SRSWRS has begun distributing reclaimed water through the Geysers Project pipeline system. The project will transport 11 mgd of tertiary-treated recycled water to the Geysers steam fields, where it will be used to generate electricity. The project will make additional water available for future agricultural irrigation in the Alexander Valley (a premium grape-growing region) and other portions of the county. The first 30 miles of the Geyser pipeline have been oversized and could eventually accommodate wastewater flows of more than 40 mgd. The project is expected to reduce by 60 percent the amount of wastewater annually discharged into the Russian River by SRSWRS. The project will also provide expanded long-term water reuse opportunities for the Subregional System, as well as future reuse opportunities for other agencies such as Windsor, Healdsburg, and the County of Sonoma (Santa Rosa 2003b).

- The City of Petaluma Wastewater Treatment Facility provides wastewater treatment for the City of Petaluma and also treats water that is collected by the Penngrove Sanitation Zone. The Petaluma plant uses biofiltration, active sludge, and aeration ponds to meet secondary treatment standards. The design capacity of the Petaluma facility is 5.2 mgd and the current average daily dry-weather flow is approximately 4.6 mgd (SCWA 2000c).

  The Wastewater Treatment Facility is allowed to discharge treated wastewater to the Petaluma River between October 21 and April 30. Wastewater must first be diluted by a factor of 10:1 before it can be discharged into the river. Discharge of wastewater into dead-end sloughs and similar confined waters is prohibited (SFBRWQCB 1998).

- The Novato Sanitary District operates two WWTPs, Ignacio Publicly Owned Treatment Works (IPOTW) and Novato Publicly Owned Treatment Works (NPOTW), that serve Novato and surrounding areas in North Marin County. The IPOTW treats water to a tertiary standard and has a maximum design capacity of 2.0 mgd. The NPOTW treats water to a secondary standard and has a maximum design capacity of 4.5 mgd.

  Novato Sanitary District is allowed to discharge treated water to San Francisco Bay via a shallow water outlet between September 1 and May 31. The plant is prohibited from discharging wastewater from any point where it does not receive a minimum initial dilution of 10:1, or into dead-end sloughs and similar confined waters (SFBRWQCB 1999).

- The Town of Windsor WWTP is located on Windsor Road, approximately 8 miles north of Santa Rosa and 5 miles south of Healdsburg. The treatment plant treats wastewater to a tertiary standard (P. Jeane, SCWA, pers. comm. 2003) and has an average dry weather flow of 2.25 mgd and a peak weekly wet weather flow capacity of 7.2 mgd (NCRWQCB 2002b).

  Wastewater from Windsor is collected in 70 miles of sanitary sewer pipelines and transported to the WWTP for tertiary treatment. Following treatment, water is pumped through an irrigation/discharge transmission main, which runs approximately 5 miles from the effluent pump station to the Mark West Creek. It is used for discharges to Mark West Creek and for irrigation on nearby lands. The

WWTP is permitted to discharge treated effluent at a rate of up to 1 percent of the flow of the receiving water between October 1 and May 14 (NCRWQCB 2002b).

- Airport-Larkfield-Wikiup Sanitation Zone serves the unincorporated communities of Wikiup and Larkfield. The treatment plant has a design capacity of 0.9 mgd average dry weather flow (NCRWQCB 2001c), and treats wastewater to tertiary standard using a membrane system (P. Jeane, SCWA, pers. comm. 2003). All of the treated wastewater from this facility is recycled for use in irrigation.

- The City of Healdsburg's wastewater treatment system consists of 36 miles of sewer mains and nine sewer lift stations. The plant treats wastewater to secondary level and the effluent is discharged into a percolation pond where it can evaporate and/or percolate. Under its current permit, the City of Healdsburg WWTP is not allowed to discharge effluent into the Russian River.

7.2.2.2 Recycling of Treated Wastewater by the Water Contractors

To reduce water usage and to fulfill the requirement of NPDES restrictions on discharge of treated water into streams, the water contractors have implemented a variety of water recycling programs. These programs use reclaimed treated effluent from WWTPs to increase water availability for agriculture, parks, urban landscaping, and golf courses. Some of the recycling programs that are currently in use or that are under consideration are listed below.

Santa Rosa Subregional Wastewater Reclamation System

The City of Santa Rosa operates and maintains the Santa Rosa Subregional Wastewater Reclamation System, which treats wastewater for the cities of Cotati, Rohnert Park, Sebastopol, Sonoma, and Santa Rosa, as well as the unincorporated South Park County Sanitation District. It is composed of the Laguna and Oakmont Wastewater Treatment Plants, which provide tertiary wastewater treatment for the cities of Cotati, Rohnert Park, Santa Rosa, Sebastopol, and the South Park County Sanitation District.

Reclaimed water from the Subregional System is used to irrigate golf courses, and commercial properties in Santa Rosa and Rohnert Park, and agricultural areas (including vineyards) in the vicinity of Santa Rosa, Rohnert Park, Cotati, and Sebastopol. Approximately 10,000 AF of recycled water is used to irrigate 6,000 acres of land during the summer. Storage of treated wastewater increases in the fall after the irrigation season ends. Under NCRWQCB guidelines, tertiary treated water can be discharged to the Laguna de Santa Rosa between October 1 and May 15, only after the flows at the Hacienda Bridge (near Guerneville) exceed 1,000 cfs (SCWA 2000c). Discharge cannot exceed 1 percent of the Russian River flow except upon written authorization from the Executive Director when up to 5 percent discharge can be permitted.

The Santa Rosa Subregional Wastewater Reclamation System plans to increase the amount of reclaimed water it recycles through the proposed Geysers Recharge Project. The project would transport 4,000 MG of recycled water per year to the Geysers steamfield for the generation of electricity. The Geysers Project will allow the Subregional System to operate independently of weather conditions and relieve the potential for discharges exceeding permitted amounts into the Laguna de Santa Rosa.

City of Petaluma

The SFBRWQCB only allows the Petaluma WWTP to discharge effluent into the Petaluma River between November 1 and April 30. Therefore, in the summer, the City of Petaluma recycles approximately 36 percent of its annual dry weather flow of waste-water, which receives secondary treatment prior to recycling. The treated recycled water is then used to irrigate 800 acres of agriculture and 100 acres of golf course in the vicinity of the city. In 1999, the Petaluma Facility recycled approximately 2,393 AF of treated effluent between May and October (SCWA 2000c).

The City of Petaluma is in the process of developing a new wastewater treatment plant that will produce additional recycled water to serve the community. The facility will serve the existing service area by providing tertiary treatment and helping reduce usage of Russian River water (SCWA 2000c).

To further reduce its water use, Petaluma has begun implementing a comprehensive monitoring, operations, and maintenance program for the city's 200 miles of water collection pipeline to identify leaks and prioritize needed repairs.

Forestville County Sanitation District

The NCRWQCB only allows the Forestville County Sanitation District to discharge wastewater to Jones Creek (a secondary tributary to the Russian River) from November to May. While the district currently treats wastewater to a secondary level, they are in the process of upgrading their facility to allow for tertiary treatment. During the rest of the year, recycled effluent from the Forestville treatment plant is used to irrigate vineyards, berry farms, and pastures in the Forestville area. Approximately 11 MG of water per year is reused to irrigate between 25 and 30 acres. The Forestville to Graton pipeline allows for the delivery of recycled water to property owners along the pipeline route (SCWA 2003b).

Novato Sanitary District

Between November and April, the SFBRWQCB permits the Novato Sanitary District to discharge treated wastewater to the San Francisco Bay, via a shallow water outlet. During the rest of the year, the discharge of effluent is prohibited to the Bay and the Novato Sanitary District stores treated wastewater in two storage ponds. Water stored in the ponds is used for wildlife habitat and the irrigation of 820 acres of agricultural land adjacent to Highway 37. Approximately 1,850 AF of reclaimed water is recycled annually from the two treatment facilities (IPOTW and NPOTW).

City of Sonoma and Valley of the Moon Water District

Between May 1 and October 31 water treated at the SVCSD wastewater facility is transported to their reclamation facility where it is used for wetland enhancement and to irrigate pastures and vineyard land. Effluent is currently treated to a secondary level, however, the district is planning on upgrading to tertiary treatment in 2004. Approximately 1,200 AF of effluent is reused on an annual basis (SCWA 2003b). The reclamation facility includes four water storage reservoirs that supply irrigation water to local water users (SFBRWQCB 2002).

The reclamation project also includes three wetland enhancement areas and eleven upland ponds located approximately three miles southeast of Schell Slough. The upland ponds provide open water habitat for waterfowl. The enhancement project used treated wastewater to restore wildlife and wetland habitats, which had been previously modified through agricultural use to predominantly pasture and hay fields (SFBRWQCB 2002).

Between November 1 and April 30 treated wastewater at SVCSD is discharged into Schell Slough, a tributary to San Pablo Bay.

Town of Windsor

The Town of Windsor recycles about 300 MG of treated wastewater annually. Primary uses for reclaimed water are agricultural irrigation (food crops, vineyards, sod farms, Christmas tree farms, etc.), ornamental plants, parks and playing fields, golf courses, cemeteries, recreational waterways for boating and swimming, cooling tower water, groundwater recharge, and toilet flushing (Town of Windsor 2003).

Airport-Larkfield-Wikiup Sanitation Zone

The Airport-Larkfield-Wikiup Sanitation Zone recycles 100 percent of the wastewater it treats. The treatment plant disposes tertiary effluence by irrigating 311 acres of land on Airport property, located in the Wikiup, Larkfield area (NCRWQCB 2001c).

7.2.2.3 Effects of WWTP Activities on Listed Salmonids in the Russian River

The SRSWRS, Forestville CSD, Occidental CSD and Town of Windsor WWTP all have permits to discharge treated wastewater into Russian River tributaries located in the Guerneville and Mark West watersheds (e.g., Jones Creek, Dutch Bill Creek, Mark West Creek, and Laguna de Santa Rosa). These municipalities are only permitted to discharge wastewater at a rate of 1 percent of stream flow, except for the SRSWRS, which is permitted to discharge at rates up to 5 percent of flow. All effluent must be treated to at least a secondary level. Given these relatively low rates of discharge, it is unlikely that nutrient inputs into the tributaries would change water chemistry and/or reduce oxygen levels.

The seasonal discharge prohibitions mandated by the NPDES permitting of the wastewater treatment facilities in the Russian River to provide extra protection for salmonids during the fry and juvenile period. This reduces the potential affects of chemical pollutants and other contaminants on salmonids during the life-history stages when they are most at risk from changes in habitat quality. Water recycling and conservation programs also help minimize impacts of wastewater production.

There is also the issue of treated wastewater that originates from the Russian River being discharged into the San Francisco Bay region. Given the strict controls on the seasonal timing of discharges and the level of wastewater dilution required under SFBRWQCB permits, the effect on listed salmonids is likely to be negligible.

In general, limiting wastewater discharge to winter months and instituting effluent recycling practices increases the supply of water for agricultural lands without significantly affecting salmonid habitat in the Russian River. Thus, the expected risk to salmonids due to *interrelated activities* of the wastewater treatment facilities in the project area is expected to be low.

7.2.3 Conservation Measures within the Service Areas

7.2.3.1 Water Conservation Practices by SCWA

SCWA has implemented several BMPs to conserve water usage from the Russian River. A study by Maddaus et al. (1995) determined the potential water savings, and economic costs and benefits to SCWA of implementing BMPs, and developed a water conservation program for SCWA to assist water contractors in implementing cost-effective BMPs.

The BMPs, adopted by SCWA, increase the efficiency of water usage in the Russian River watershed by reducing water loss during transmission to customers, educating residents about water conservation issues, and increasing water use efficiency through monetary incentives.

The following is a list of the BMPs practiced by SCWA:

- System Water Audits, Leak Detection, and Repair: Audit of the water distribution system to reduce unaccounted-for water. Audits are conducted three times a year and leak detection and repair are performed if they are cost-effective (i.e., they significantly reduce the amount of water lost during transmission).

- High-Efficiency Washing Machine Program: SCWA provides rebates to water contractor residential customers who buy water-conserving washing machines. This program is an extension of the PG&E purchase of water-conserving washing machines Energy Rebate Program.

- Public Information Program: SCWA has drafted a public information plan to increase awareness of the importance of water conservation. Information is made available to the public through tri-fold bill stuffers, press releases, marketing on radio and television, and at fairs and sporting events.

- School Education Program: SCWA offers a Water Education Program (WEP), free of charge, to all public schools within the service area of the water contractors. The program is designed to help educators teach students the value of water as an important natural resource. The WEP includes direct instruction for classroom and field studies, educator workshops, biannual educational newsletter, distribution of water education calendar, and speakers bureaus throughout the service area.

- Wholesale Agency Assistance Program: SCWA's Water Transmission System fund provides approximately $2 million annually for water conservation and water education programs to help water contractors implement cost-efficient water conservation programs. SCWA also provides technical support and information to contractors on a regular basis and upon request.

- Conservation Pricing: SCWA is a wholesale water agent that sells water to its contractors at a uniform rate. In general, the uniform commodity rate is relatively high compared to the monthly service charge, which acts as monetary incentive for customers to reduce water usage.

- Conservation Coordinator: The SCWA conservation coordinator is responsible for coordination and oversight of conservation programs and BMP implementation in the service area of the water contractors.

7.2.3.2 Water Conservation Programs Implemented by the Water Contractors

SCWA has required that all eight of its retailers join the California Urban Water Conservation Council and commit to implementing the 14 BMPs of urban water conservation. In so doing, SCWA becomes the first region in the state to have 100 percent membership in this council.

Below are the most common water conservation measures currently practiced by the water contractors:

- Residual Water Audits and Plumbing Retrofitting: This measure targets residents in an effort to reduce indoor and outdoor water use, especially during peak-use periods (daytime during the summer). Homes with the highest water usage are offered a free audit that includes water conservation measures (e.g., low-flow showerheads and leak repair) and developing an irrigation system.

- System Water Audits, Leak Detection, and Repair: Audit of the water distribution system helps reduce unaccounted-for water. Audits are conducted three times a year and leak detection and repair are performed if they are cost-effective (i.e., they significantly reduce the amount of water lost during transmission).

- Installation of Water Meters: The installation of meters on residential water connections is required to help curb use, especially during peak periods. Metering has been shown to reduce residential consumption by up to 10 percent for indoor use, and 25 percent for outdoor use.

- Large Landscape Conservation Program and Incentives: Audits are conducted to increase the efficiency of water use on landscapes containing more than 3 acres of turf. The object of these audits is to reduce peak water use by applying methods developed by the California Department of Water Resources, and to help ensure accurate irrigation maintenance schedules throughout the year. Audits can reduce water demand on large landscapes by up to 14 percent.

- Commercial/Industrial/Public Incentives for Irrigation System Upgrades: Rebates are offered to customers who install devices or apply watering techniques that reduce water use by more than 1,000 hundred cubic feet per year, over at least a 5-year period. Installation of state-of-the-art technology offered by the irrigation industry can result in average water savings of 15 percent for irrigators.

- Low Water-Use Landscape Ordinance: These are laws requiring the use of low water-use plants and efficient irrigation systems in landscape design for any newly developed commercial industry, public parks, and multi-family residents. Compliance with the ordinance can achieve savings of 20 percent for newly landscaped areas.

- Commercial/Industrial/Public Indoor Water Audits: This measure targets commercial, industrial, and public water users. Building owners are contacted and offered a free interior water audit and sufficient incentives to achieve implementation of audit findings. The long-term goals of the audit include reducing leaks, optimizing cooling tower operations, implementing process water improvements, and incorporating recycling retrofits. Audits are repeated every 5 years to maintain or improve conservation levels. On average, audited sites reduce their water demand by approximately 13.5 percent.

- Commercial/Industrial/Public Outdoor Water Audits: This measure targets commercial, industrial, and public water users and is similar to residential large landscape audits. One of the key goals of this management practice is to establish the correct watering schedule to maximize water efficiency. Irrigation audits of this type on outdoor properties save approximately 14 percent of exterior water use.

- Water-Efficient Landscape and Irrigation System Incentives: This program offers incentives to single and multi-family homes to install water-efficient irrigation systems for landscaping. To qualify, customers must have drip irrigation for plants, system timers, and rain sensors. Homes that install efficient irrigation systems can reduce outdoor water usage by almost 20 percent.

- Ultra Low-Flush Toilet Replacement: Water contractors offer a rebate to customers who replace high-use toilets with 1.6 gallons per flush models. The installation of these toilets is estimated to reduce interior water use by 14.7 percent.

- Incentives for Commercial/Industrial/Public Toilet/Shower Replacement: Cash rebates are offered to encourage replacement of existing toilets and urinal valves in the commercial/industrial/public sectors that use more than 1.6 (toilets) and 1.0 (urinals) gallons per flush. Low-flow showerhead replacement is encouraged for commercial/industrial/public customers that have a significant number of showerheads (e.g., schools). This translates into water savings of 15.4 gallons per employee per day.

The eight primary water contractors are implementing most of these conservation programs, to some degree. Table 7-3 shows the estimated yearly water savings by the cities served by the water contractors as a result of implementing conservation practices. Each value in the table represents the estimated water savings for each city and was calculated by summing up the estimated water savings for several different recycling programs. By adding up all the values for each city, the total estimated water savings is about 19,930 AFY, which is about 3 times the savings projected for the WSTSP (see Section 4.2). Note that the values in the table may underestimate the effectiveness of these programs, as the water savings for many conservation activities are hard to estimate directly (e.g., savings from educational programs).

Table 7-3 Water Savings Due to Water Conservation Practices

Water Contractor	Estimated Water Saving (AFY)
Santa Rosa	6381.1
Rohnert Park	7,869.2
Sonoma	75.6
Cotati	177.4
Forestville	72.2
Petaluma	2,186.8
North Marin Water District	1,969.8
Valley of the Moon	1,202.0

Source: SCWA 2000c

7.2.3.3 Effects of Water Conservation Practices on Listed Salmonids

The water conservation practices implemented by the water contractors, combined with the BMPs currently practiced by SCWA, will improve the efficiency of Russian River water usage. This could contribute to the maintenance of suitable habitat conditions for salmonids by reducing the amount of water diverted from the Russian River, especially during the summer. In general, the conservation practices implemented by the water contractors should help SWCA maintain adequate flows for rearing and spawning as outlined in the Flow Proposal (Section 5.2) and thus provide a slight benefit for listed salmonids.

7.2.4 SUMMERTIME RUNOFF

Most Russian River water delivered to customers within the service areas is used for internal residential and commercial purposes. After use, a portion of this water ends up in a sewer system and is piped to a waste treatment plant. Some of the water supply is also used for outdoor landscaping in the summer. This water can seep into the groundwater and/or runoff into gutters, and thus reenter the Russian River without first being treated. Currently there are no estimates on how much water is used for landscaping and the amount of runoff from landscaping that ends up in Russian River tributaries.

Any customer of one of SCWA's water contractors may use sprinklers to irrigate turf grass, gardens, landscaped areas, and trees or shrubs. Other outdoor uses for water include washing cars, filling swimming pools, uncorrected outdoor plumbing leaks, and fire hydrant use. All of these activities can contribute to the runoff of water back into Russian River streams (SCWA 2000c).

In drought years, most cities in the service area have contingency plans that allow sprinkler use only at night, typically from 7:00 p.m. to 9:00 a.m. They also try to set limits on the amount of outdoor water use by customers based on a formula that accounts for the landscaping area and the irrigation efficiency of the type of turf (or crop) being watered (SCWA 2000c).

7.2.4.1 Programs to Reduce Contamination Due to Runoff

SCWA collaborates with the City of Santa Rosa and the County of Sonoma to perform monitoring tasks in order to characterize runoff water quality. Chemical monitoring is performed for metals, organic materials, nutrients, and other parameters. Biological monitoring includes a survey of the benthic macroinvertebrate communities in riffle areas of perennial streams and bioassays using rainbow trout in sampled streams.

To reduce contaminant inputs from runoff into the Russian River, the City of Santa Rosa and SCWA have collaborated on a public outreach program to reduce pesticide use through an Integrated Pest Management Program. The goals of this program are to:

- Increase public awareness of pesticide effects on water quality.
- Reduce environmental risks associated with pesticide use.
- Provide information on less toxic pest management techniques and proper use and disposal of pesticides.
- Provide training for personnel to disseminate information about pesticides.

The most commonly used pesticide is Diazinon, which is a common household pesticide used widely in yards and gardens. It has been found in rivers and streams of California and the Pacific Northwest, in both agricultural and urban areas. Diazinon may harm fish by disrupting behaviors that usually help young salmon escape predators, reducing the insect food base available to juvenile salmon, inhibiting reproductive behavior, and causing genetic damage.

No streams or flood control channels within the NPDES permit boundaries in the Mark West Creek watershed are currently identified on the Section 303(d) list as impaired for Diazinon. A recent water sample obtained in this region also indicated low concentration levels (ENTRIX, Inc. 2001c).

SCWA, along with the City of Santa Rosa and the County of Sonoma, continues to perform chemical, bioassay, and macroinvertebrate monitoring to characterize the effects of runoff on water quality. SCWA's goal is to reduce the influx of chemical, pesticides, and other pollutants, in order to improve water quality in the basin and reduce environmental risks to fish species.

7.2.4.2 Effects of Runoff on Listed Salmonids

Summer runoff may result in inputs of nutrients, particulates, and other pollutants into the Russian River or its tributaries. While high concentrations of pollutants could occur locally near urban and agricultural areas, monitoring programs by SCWA and Santa Rosa suggest that chemical concentrations fall within safe limits for fish.

The effects of summer runoff on salmonids is likely to be small, due to the low concentrations of pesticides and other pollutants in the water column. Fry and young juvenile steelhead would be the most vulnerable to this effect, since they rear in tributaries in the Santa Rosa and Mark West Creek watersheds, where summer runoff of water, initially purchased by the water contractors from SCWA, is most likely to occur. However, given that chemical inputs are very localized in space and time, that their concentrations are low, and that they are likely to have a short residence time, the impact on listed species should be low.

7.3 NON-NATIVE PREDATORS STOCKED IN RESERVOIRS FOR RECREATIONAL FISHING

The impounded water at Lake Mendocino and Lake Sonoma is used for maintaining non-native recreational fisheries. These reservoirs provide habitat that is conducive to the production of stocked warmwater fish species, some of which are potential predators of salmonids. Following the introduction of warmwater game fish, such as largemouth bass, smallmouth bass, redear sunfish, bluegill, green sunfish, there is no need for subsequent stocking. Striped bass will not spawn in a reservoir. Currently, the CDFG only stocks striped bass periodically into Lake Mendocino (but not Lake Sonoma), although they also plant trout upstream of Lake Mendocino (M. Grissin, Mendocino Parks and Recreation, pers. comm. 2003). Because these fisheries could not exist without the water management of the reservoirs, the stocking of non-native fisheries is an *interrelated activity* to the project.

Maintenance activities associated with the fisheries behind the dams provide source populations that may help to maintain non-native predatory species in the Upper Russian River and Dry Creek. Persistent populations of predatory fish are already well-established throughout the watershed due to seeding when the reservoir fisheries were originally started. If escapement from the reservoirs were high enough, these source populations could intensify predation pressures on juvenile salmonids, causing a decrease in their survival rates.

Although the potential for predatory fish to escape from Lake Mendocino to the East Fork still exists, the escape rate is likely to be low because water intake structures are located near the bottom of the dam (approximately 200 feet below the spillway). In fact, only one striped bass has been observed in the East Fork during SCWA monitoring studies conducted over the past several years (S. White, SCWA, pers. comm. 2003b). Passage of predators through Coyote Valley Dam would be limited in the summer, when Lake Mendocino becomes thermally stratified. Stratification results in low temperatures and DO levels at the intake structure that are unfavorable for warmwater predators, and thus should impede their passage into the Russian River.

Lake Sonoma also becomes thermally stratified during the summer and DO in the hypolimnion is gradually depleted near the intake valves on Warm Springs Dam. Temperature and oxygen stratification restrict habitat for the warmwater fish species in the reservoir to surface waters. Because water at Warm Springs Dam is drawn from the deeper depths of the reservoir, bass, pikeminnow and other predatory species are less likely to be entrained in the outflow. The reservoir is not stratified during the winter; however, coldwater conditions found below the dam are likely to negatively affect predator survival should they escape during this period. Although limited sampling data exists, it is unlikely that large populations of predators would be present in Dry Creek, due to dam operations.

Although the potential exists for warmwater predatory fish species to escape from Lake Mendocino and/or Lake Sonoma, it is unlikely that the rate of escape would have a substantial affect on the large predator populations that already exist in the Russian River and Dry Creek. Thus, the risk to listed salmon species from the reservoir fisheries is likely to be very low relative to baseline conditions.

7.4 Recreational Fishing For Hatchery Produced Steelhead In The Russian River

Recreational fishing is available throughout the year on the Russian River mainstem and Dry Creek for hatchery steelhead, as well as smallmouth bass, catfish, and shad. Fishing is prohibited in the tributaries. While fishing in the mainstem is permitted all year, most steelhead fishing is done from October through March when the adults return to spawn (CDFG 2003). Because recreational fishing for hatchery produced steelhead can potentially harm listed salmonids and would not exist, but for the proposed hatchery program, it is an *interrelated activity* of the project.

The prohibition on take of naturally-spawned steelhead reduces direct fishing mortality, however, indirect effects due to accidental hooking and harassment can still affect wild adults. For instance, in 1999, the CDFG steelhead report-restoration card program reported that a total of 454 fishing trips were taken by the relatively small number of anglers (143) who voluntarily returned their steelhead report cards. The total catch of steelhead from these fishing trips was estimated to be 235. Of these, 107 were naturally-spawned fish and the remaining 138 were produced in the hatcheries. Seven wild fish were kept (presumably due to lack of knowledge of regulations) and the remaining 100 were released, while 53 of the hatchery fish that were caught were released (M. Hammer, Northwest Economic Associates, pers. comm. 2003). While the take of wild adult salmonids is probably relatively insignificant, there is a possibility that hooking and handling could pose a mortality risk to adult spawners.

There is also the potential that the recreational fishery could harm juveniles. Because juveniles are much smaller than adults, accidental hookings are more likely to have detrimental effects (although how often this happens is unknown). More importantly, however, fishers wading in the Russian River could stress rearing salmonids and accidentally destroy redds by stepping on them.

There appears to be a moderate risk of direct take of wild steelhead due to fishing; however, the risk of injury due to hooking may be significant. It is also possible there is a small risk to coho salmon and Chinook salmon, as they could be hooked as by-catch during the fishing season. There is, however, no information on the effects of the recreational fishery on mortality rates of coho salmon or Chinook salmon.

7.5 CHANNEL MAINTENANCE ON PL 84-99 (NONFEDERAL) SITES IN RUSSIAN RIVER AND DRY CREEK

SCWA and MCRRFCD are responsible for channel maintenance activities related to the Coyote Valley Dam Project at levees along the Upper Russian River. This includes channel maintenance conducted on federal sites and inspection of PL 84-99 (nonfederal) sites (evaluated in Section 5.4).

Sonoma and Mendocino counties originally worked through the USACE to perform maintenance work on the river. Inspections were performed on the nonfederal levees in the mainstem Russian River and the property owners were informed of the needed repairs. In general, the USACE inspected private levees and then instructed landowners on how to minimize affects of federal flood control works, to minimize the potential of destruction to property. In exchange, the landowners received property insurance against damages due to flooding. Should landowners fail to make repairs recommended by the USACE, then their insurance is revoked.

To carry out maintenance on nonfederal sites, landowners may be required to obtain a Section 404 permit from the USACE. The USACE must weigh the need to protect aquatic resources against the benefits of the proposed development before they grant a permit. USACE policy requires applicants to avoid impacts to wetlands and other U.S. waters to the extent practicable and take measures to compensate for unavoidable impacts (Environmental Protection Agency 2003b).

The effects of the *interdependent activity* of maintenance at nonfederal sites on salmonids are a result of compliance by landowners to the maintenance recommendations established by USACE and monitored by SCWA. Recommended actions for the Russian

River at the nonfederal sites are primarily for erosion control and include patching of holes in the levee surface, restoring riprap at the base of some levees, and removing vegetation from the levee face. Compliance with these recommendations results in bank stabilization and the reduction of logjams in the Upper Russian River, which can reduce sediment loading of spawning grounds and improve fish passage.

Potential *interdependent effects* related to maintenance of levee stabilization projects may be both positive and negative for salmonids. Positive effects are associated with reduction or prevention of erosion and resulting sedimentation in the channel. Negative effects may be associated with loss of riparian shading and increased water temperatures. Bank stabilization techniques may reduce the complexity of instream cover naturally provided by undercut banks, and exposed root wads. Additionally, the recruitment of spawning gravels, which are often supplied by natural bank erosion processes, may be impeded by bank stabilization structures.

7.6 City of Ukiah's Hydroelectric Facility

The City of Ukiah owns, operates and maintains the Lake Mendocino Power Project (LMPP) at Coyote Valley Dam. The project was added externally to the downstream base of Coyote Valley Dam in 1986 at a cost of $22 million (*Interim Report 7*, Hydroelectric projects operations, ENTRIX, Inc. 2000b). The LMPP is operated under a 50-year FERC license (Project No. 2481-001) issued in 1982. The City of Ukiah belongs to the Northern California Power Authority, which owns and operates various power generation plants land throughout California and provides power to their member. The City of Ukiah has used the LMPP to supplement other power sources within their system. The LMPP has no contractual minimum power requirements. Power has been generated in the past when releases were made by the USACE.

The FERC permit requires that the LMPP maintains downstream DO level at 7.5 mg/l at least 90 per cent of the time with a minimum requirement of 7 mg/l and a median monthly value of 10 mg/l for the year (FERC 1982). When operating, the LMPP is also required to provide between 7 and 15 cfs of water to the CVFF (FERC 1983).

The hydraulic turbines can operate at flows between 175 and 400 cfs; power generation is possible at flow below 175 cfs. To initiate or terminate hydroelectric operations, the City of Ukiah must switch a Tainter gate. To make the switch, the City of Ukiah must make a request to the USACE to close the slide gates. For this process, the USACE would stop water releases at Coyote Valley Dam for approximately 5 hours during the switch. Because the City of Ukiah could not switch the Tainter gate without the water management operations at Coyote Valley Dam, stopping flows to switch the Tainter gate is an *interrelated activity* to the project.

The USACE has made a recommendation to the City of Ukiah to modify the Tainter gate. This modification would allow the city to initiate or terminate hydroelectric operations without the need to stop releases from the dam. In order to make the required modifications to the Tainter gate and to continue operations of the Lake Mendocino Power Project, the City of Ukiah will undergo a Section 7 consultation with USACE.

Because this consultation will require a determination of the project effects on listed salmonids and their habitat, the operation of the hydroelectric facility is not considered in this BA.

7.7 THE EFFECTS OF INTERRELATED/INTERDEPENDENT ACTIVITIES

7.7.1 COHO SALMON

The *interrelated/interdependent activities* that could affect coho salmon include water distribution wastewater discharge, summertime runoff, recreational fishing, and predator escapes from reservoirs.

Water Distribution

The primary risks to coho salmon from the distribution of SCWA water to the water contractors would be due to accidental spills from stage tanks and leakage from transmission pipelines of treated water containing trace concentrations of drinking water treatment chemicals, primarily chlorine. Should such an event occur, the effects are likely to be highly localized. The primary areas where spills could affect coho salmon are Santa Rosa Creek, Laguna De Santa Rosa, and Green Valley Creek. All of the water contractors follow the SPCC plans, which are design to reduce accidents. Thus, the risk to coho salmon from the effects of the *interrelated activities* associated with water distribution to the water contractors is likely to be very small.

Wastewater Discharge

The discharge of wastewater into tributaries where coho are present (principally, Mark West Creek, and Laguna de Santa Rosa) is expected to have relatively minor effects on coho salmon, as coho abundance is low in these tributaries. Wastewater treatment plants that discharge into streams in the San Francisco Bay are unlikely to affect coho salmon, as they are currently thought to be extinct in the Bay Area watersheds (Brown, et al. 1994). Coho salmon runs, however, were historically present in the Bay Estuary, so discharges into San Francisco Bay tributaries could have an effect on the future recovery of coho salmon in this region. The severity of the risk posed to coho salmon depends on the amount of discharge relative to streamflows and the ability of treatment plants to remove contaminants. Currently, most treatment plants cannot discharge at a rate greater than 1 percent of the receiving flow (except for Santa Rosa WWTPs), so the concentration of contaminants into streams is expected to remain low. Discharge into the streams occurs when flows are higher (during and after the winter rains).

The greatest potential for contaminants to affect coho salmon are in Laguna de Santa Rosa, where the SRSWRS is allowed to discharge treated wastewater at rates as high as 5 percent of the flow rate. The Laguna de Santa Rosa was added to a Section 303(d) list in 1990 due to high levels of ammonia and low DO concentration as a result of eutrophication due to high nutrient inputs. Although the SCWA Waste Reduction Strategy has reduced ammonia concentrations to acceptable levels, DO continues to be a problem due to nutrient-enriched wastewater deposits (NCRWQCB 2001b).

Both SCWA and the water contractors are working to increase the amount of wastewater that is recycled for agriculture and the Geysers project. This would reduce the level of effluent released back into the Russian River (and the San Francisco Bay) and would improve rearing conditions for coho salmon above baseline conditions. Given that the current abundance of coho salmon in Laguna De Santa Rosa is very low, the risk to coho salmon from the effects of the *interrelated activities* of wastewater discharge is expected to be low. Increased recycling via the Geyser Project could lower the discharge rate into Laguna De Santa Rosa, and help facilitate the recolonizing of this stream in the future.

Summertime Runoff

The effects of runoff due to lawn watering and other outdoor uses of SCWA water could pose a small risk to coho salmon. Most runoff, however, occurs in urban streams (principally in the Mark West watershed) where coho salmon rearing is limited. Runoff could increase the amount of vegetation growing in the constructed flow control channels, which would increase maintenance activities in these areas. This could lead to more sediment in the constructed channels due to workers removing excess vegetation in order to prevent channels from flooding. Excess sedimentation could degrade rearing habitat by filling in pools, increasing water temperature, and reducing prey abundance. However, since there are currently so few coho salmon rearing in the constructed flood channels, this effect is likely to be small.

Water runoff from lawns could also increase riparian vegetative growth in natural tributaries. This should improve habitat by creating more cover for rearing juveniles, reducing temperatures and increasing habitat complexity. How beneficial this is to coho salmon is hard to gage given the lack of information on the effects of summer runoff on riparian growth.

Pesticide and chemical contamination of rearing streams are also a potential consequence of summertime runoff, however, studies have shown that most pollutants are washed into the Russian River during the first winter storms (i.e., first flush). However, these high concentrations do not last very long as chemicals are quickly dissipated even in tributaries such as Laguna de Santa Rosa (Katznelson et al. 2003). After the first flush, concentrations appear to remain low for the rest of the year (ENTRIX, Inc. 2001c). Thus summertime runoff from lawn watering and other outdoor uses are unlikely to negatively affect coho salmon. SCWA will monitor chemical levels to ensure that increased build-up of pollutants does not become a problem in the future.

Recreational Fishing

Recreational fishing for hatchery steelhead and other species, using both fly and conventional lure, occurs from October through March when steelhead adults return to spawn. In Dry Creek, findings from the CDFG steelhead report-restoration card program suggest that up to half of the fish caught are native steelhead or other salmonid species (M. Hammer, Northwest Economic Associates, pers. comm. 2003). Thus, there is a small possible risk to migrating and spawning adults as a result of bycatch during recreational fishing period. Given that coho populations are currently located in tributaries to the lower Russian River, the risk of incidental take is likely small.

Hooking stress following release could potentially lead to mortality of migrating adults. Also, fishing could stress rearing juveniles, especially if recreational fishers wade in streams and step on redds (increased egg mortality). In general, there are no studies on the level of take of coho salmon due to the steelhead hatchery fishery. The risk to coho salmon adults is probably small and is not expected to change from baseline conditions.

Predator Escape from Reservoirs

Several self-sustaining populations of predatory fish species currently exist in the Russian River, which were introduced following the completions of Coyote Valley and Warm Springs dams. Because the current rate of predator escape from reservoirs is likely to be low due to the placement of intake valves at the bottom of the dams, the continuation of the fishery in Lake Sonoma is not expected to result in any appreciable increase in predation rates on coho salmon. Thus, the risk to coho salmon is unlikely to change relative to baseline conditions.

Maintenance at PL 84-99 Sites

There are no expected effects from maintenance at PL 84-99 sites as these activities occur in the upper mainstem, where coho salmon are not present.

7.7.2 STEELHEAD

Activities that are *interrelated/interdependent* to the project that could affect steelhead include water distribution, wastewater discharge, summertime runoff, recreational fishing, predator escapes from reservoirs, and maintenance at PL 84-99 sites.

Water Distributions

The risk to steelhead from water distribution is very low and similar to those for coho salmon. Streams where there is a small localized risk due to accidental spillage are primarily Santa Rosa and Green Valley Creeks.

Wastewater Discharge

The discharge of wastewater into Russian River tributaries between mid-fall and early spring is expected to have less of an effect on steelhead than coho salmon as they do not rear in the Laguna De Santa Rosa (which is probably the stream most affected by wastewater discharge). The only streams in the Russian River that have steelhead and receive treated wastewater are Dutch Bill Creek and Mark West Creek (see Table 2-7). Steelhead, however, are also found in Schell Slough and Petaluma Creek, which receive effluent from the Sonoma Valley CSD and the Petaluma WWTP. While these streams drain into the San Francisco Bay, steelhead populations in this region belong to the same ESU as those in the Russian River. Thus, at the level of the ESU, there is a small risk to steelhead due to the *interrelated activities* associated with the discharge of treated wastewater originally purchased (or diverted) from SCWA.

Summertime Runoff

Interrelated effects on steelhead due to runoff from watering of lawns and other outdoor activities are most likely to affect rearing habitat in Mark West Creek and possible Dutch Bill Creek. Potential effects to steelhead are similar to those described for coho salmon (see above).

Recreational Fishing

Instream recreational fishing season for hatchery steelhead is from October through March throughout the Russian River, using both fly and conventional lure. Hatchery steelhead have a clipped adipose fin to distinguish them from naturally-spawned steelhead. Although this distinction does not stop recreational anglers from catching them, it indicates they are to be released after they are caught. Evidence suggests that 50 to 100 wild adult steelhead are caught and released each year (Northwest Economic Associates 2003). This could result in increased mortality to adults as a result of injuries sustained during hook and release, although the use of barbless has been shown to significantly reduce hooking mortality rates (Mongillo 1984).

Because the mainstem Russian River is primarily a migration corridor connecting steelhead spawning habitat, recreational fishing on hatchery steelhead and other species could affect spawning success. The risk to wild steelhead is probably greater than to other listed salmonids because they are more similar in to hatchery steelhead and therefore are more likely to be accidentally caught. However, this risk to wild steelhead from recreational fishing is not expected to change from baseline conditions.

Predator Escape from Reservoirs

Current rates of non-native predation on steelhead are primarily a result of past introductions when the fisheries at Lake Sonoma and Lake Mendocino were first established. Thus, predation pressures resulting for the non-native fisheries species are not changing relative to baseline conditions. Risks to steelhead are similar to those for coho salmon.

Maintenance at PL 84-99 Sites

Channel maintenance on PL 84-99 sites could potentially have negative effects on salmonids due to loss of riparian shading, sedimentation, and a reduction of instream cover. However, since maintenance operations on PL 84-99 sites are infrequent, affect a limited area of the mainstem, and require a Section 404 permit, which gives USACE authority to regulate discharge of dredged or fill materials into streams. In general, permit holders would be required to avoid wetland impacts where practicable and provided compensation for any unavoidable impacts through restoration activities. This Section

404 permit program should reduce negative effects to salmonid habitat from maintenance practices. Thus, the risk to steelhead is expected to be small.

7.7.3 Chinook Salmon

The interrelated/interdependent project effects that could affect Chinook salmon include wastewater discharge, recreational fishing, predator escapes from reservoirs, and maintenance at PL 84-99 sites.

Water Distributions

Chinook salmon primarily spawn and rear in Dry Creek and in the mainstem Russian River above Healdsburg. Therefore there are no foreseen effects of water distribution on Chinook salmon.

Wastewater Discharge

There are no expected effects of the *Interrelated activities* associated with wastewater discharge on Chinook salmon in the Russian River, as discharges occur in tributaries to the lower mainstem. Chinook salmon are found in San Francisco Bay and there is a Chinook hatchery on Petaluma River. However, any effect on natural spawning Chinook salmon in the Bay Area due to the discharge of treated wastewater purchased from SCWA is likely to be incredibly small.

Recreational Fishing

Adult upstream migration of Chinook salmon occurs between the start of October through mid-January. Because recreational fishing for hatchery steelhead occurs from October through March, there is a potential for incidental injury or mortality to upstream spawners. In fact, there is currently evidence that anglers are beginning to target adult Chinook salmon (S. White, SCWA, pers. comm. 2003b), although the overall effect of this behavior on abundance is unknown. Because the mainstem Russian River is the primary spawning habitat for Chinook salmon, there could also be injury to redds and emerging fry due to anglers wading in the stream. The overall risks to Chinook salmon are from illegal take, hooking and handling mortality, misidentification and walking on redds. It is likely that the risk to Chinook salmon populations is low, because they spawn earlier in the year than steelhead (i.e., pre-spawned adult Chinook salmon are likely to be in low abundance in the Russian River when anglers begin fishing for steelhead). However, if illegal fishing for Chinook adults increases the impacts of recreational fishing could become important.

Predator Escape from Reservoirs

Current rates of non-native predation on steelhead are primarily a result of past introductions when the fisheries at Lake Sonoma and Lake Mendocino were first established. Thus, the risk to Chinook salmon are similar to those for steelhead and coho salmon.

Maintenance at PL 84-99 Sites

Channel maintenance on PL 84-99 sites could provide some benefit to Chinook salmon migration because it helps remove fish barriers in the Upper Russian River. This should improve fish passage to spawning grounds in the Upper mainstem and increase successful passage of downstream migrating smolts. On the other hand, channel maintenance could have potential negative effects on Chinook salmon due to loss of riparian shading, sedimentation, and a reduction of instream cover. In general, maintenance operations on PL 84-99 sites are infrequent and require a Section 404 permit under the Clean Water Act, which gives USACE authority to regulate discharge of dredged or fill materials into streams. The permitting process should reduce any negative effects to salmonid habitat from maintenance practices. Thus, the risk to Chinook salmon from channel maintenance on PL 84-99 sites is expected to be small.

7.8 CUMULATIVE EFFECTS

Cumulative effects under the Section 7 Consultation are defined as effects of future state tribal, local, or private actions, not involving federal actions, that are “reasonably certain to occur” within the action area (USFWS and NMFS 1998). The term “reasonably certain to occur” has been defined by NOAA Fisheries as “new” and already permitted activities, or activities in the final stages of permitting (E. Shott, NOAA Fisheries, pers. comm. 2003). Current and future effects of existing activities, such as agriculture, forestry, urbanization, water quality management, and fishery management, are considered in baseline conditions.

Adverse impacts that are reasonably certain to occur in the action area include new water diversions. Water can be diverted from the Russian River and its tributaries under riparian rights or under appropriative rights. Riparian rights allow a landowner to divert water from an adjacent stream for use on the property. Appropriative rights are granted by the SWRCB through a permit process. Any improvements or diversion structures that are constructed to facilitate water diversion for either type of right would be subject to a Section 404 permit and subject to Section 7 consultation. Those actions are not considered cumulative effects as indicated above. However, water diversions with small pumps without dams or dikes may fit the definition for cumulative effect.

The SWRCB currently has over 100 applications pending before it in the Russian River watershed. Before the SWRCB will grant permits to these applicants, the applicants must provide the SWRCB with information regarding the availability of water for appropriation and an assessment of the fish and wildlife resources or other beneficial uses that might be affected.

To help applicants through this process, the SWRCB has recently adopted a water availability analysis procedure to meet the provisions of the California Water Code. The analysis is structured to meet the requirements in the Water Code and consider effects on listed species as the SWRCB considers the applications. The requirements to be met include:

- Water Code 1260(k): That every water right application submitted to the SWRCB must include "sufficient information to demonstrate a reasonable likelihood that unappropriated water is available for appropriation."

- Water Code 1243: "In determining the amount of water availability for appropriation, the SWRCB shall take into account, whenever it is in the public interest, the amounts of water needed to remain in the source for the protection of beneficial uses…" Beneficial uses include preservation of fish and wildlife habitat.

- Water Code Section 1375(d): The SWRCB must decide that there is unappropriated water available to supply the new applicant.

In conducting the analyses to support the water rights application, the SWRCB is using the guidelines prepared by CDFG and NOAA Fisheries entitled Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversion in Mid California Coastal Streams. These guidelines were developed to provide procedures that would be adequate to protect and recover anadromous salmonids in coastal watersheds. The guidelines propose terms and conditions for large diversions (3 cfs or 200 AF) and small diversions (less than 3 cfs or 200 AF). The terms and conditions limit the season of diversion to December 15 to March 31, provide for minimum bypass flows that protect salmonid, and provide flows for channel maintenance. The guidelines also address cumulative impacts from multiple diversions, setting limits on the cumulative maximum rate of diversion from all sources at 15 percent of the high flow (20 percent exceedance). For projects that divert 5 percent of the total volume between October 1 and March 31, it must be demonstrated that the projects would not cause or exacerbate adverse cumulative effects to migration or spawning flows.

Although there may still be some adverse effects to listed salmonids, the implementation of the water availability analysis and the use of CDFG and NOAA Fisheries guidelines is likely to prevent significant new adverse effects to listed species.

7.9 SUMMARY

There are mainly four *interrelated/interdependent activities* associated with the proposed project: 1) the use and discharge of water sold by SCWA to its water contractors; 2) non-native predators stocked in the reservoirs; 3) recreational fishing for hatchery steelhead; and 4) channel maintenance on PL 84-99 (nonfederal) sites in Russian River and Dry Creek. The operation of the City of Ukiah's Hydroelectric Facility also is an *interrelated activity*; however, its effects were not considered here as its operations would be subject to a separate Section 7 consultation.

In general, the effects of the *interrelated/interdependent activities* on listed salmonids are expected to be minimal and would not change from baseline conditions. The activity that would be likely to have the greatest impact to salmonids is the discharge of treated wastewater into tributaries containing rearing coho salmon and steelhead. Given that most treatment plants are using or converting to tertiary treatment, discharged during the winter, and only discharge in a few tributaries in the Russian River, any risks to salmonids are likely to be localized. There are similar localized risks associated with spillage of chlorinated water from distribution facilities operated by the water contractors; however, these events are infrequent, and are also likely to be highly localized. Such localized events could result in impacts to fish, but the number of take incidents would most decrease relative to baseline conditions as the treatment levels of wastewater improves and more recycling programs are put into action (e.g., Geysers Project).

The cumulative effects of water diverted from the Russian River by landowners under any riparian or appropriative rights would be subject to CDFG and NOAA Fisheries guidelines. These guidelines were developed to protect salmonids by limiting the season of diversion to December 15 to March 31, providing for minimum bypass flows, and ensuring proper flows for channel maintenance. While there could still be some adverse effects to listed salmonids in the future from water diversions, the CDFG and NOAA Fisheries guidelines are likely to prevent significant impacts.

The overall benefits of the project to listed salmonids, outlined in Section 6, would more than compensate for the small risks associated with the *interrelated/interdependent activities* and the cumulative effects from future water diversions. Project actives such as instream restoration programs, the Flow Proposal, the captive broodstock program, and the improvements to the diversion facilities at Mirabel and Wohler, would improve rearing and spawning habitat, and enhance fish passage. These are important steps towards the recovery of listed salmonids in the Russian River.

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